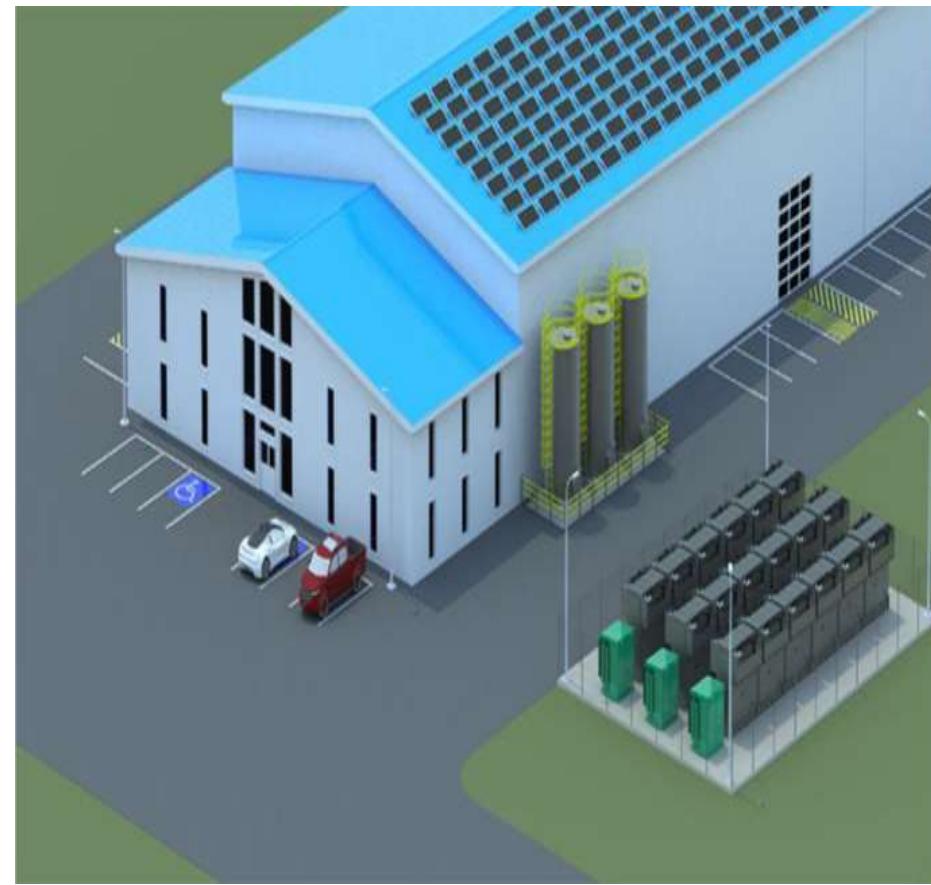




Not all of us can do great things.
But we can do small things with great love.

My iLifestyle



All info in this PPT is collected from various open sources available on the internet. I don't claim them to be correct. If you feel, my views are wrong, kindly ignore them & excuse me. I sincerely respect your views . Kindly excuse me for Typos, if any

Complied By
Vijay L Sonavane
ME(Elect)
Date: 28 Jan 2022

Thought for the day



**“Simplicity is the
prerequisite for
Reliability.”**

— [Edsger W. Dijkstra](#)

Edsger Wybe Dijkstra was a computer scientist. He received the 1972 Turing Award for fundamental contributions to developing programming languages, and was the Schlumberger Centennial Chair of Computer Sciences at The University of Texas at Austin from 1984 until 2000

In this APY issue



- **Indian Power Sector: Some Highlights & Power Market (S4- S16)**
- **Five predictions for Energy Transition trends in the UK in 2022 (S17- S22)**
- **Hospitals Need More Than a Backup: Microgrids (MG) May Be the Answer (S23- S26)**
- **Chinese port congestion resulting in increased solar project costs in India (S27- S29)**
- **GOI introduces penalty regime for non-compliance of Fly Ash utilisation (S30- S31)**
- **India Residential RoofTop Solar (RTS) Market (S32-39)**
 - Reasons for Shadow on Rooftop Solar (RTS) Progress
 - Proactive decision by MOP/MNRE: Households free to install Rooftop Solar (RTS) by any vendor under Govt scheme

Indian Power Sector: Some Highlights

Gen: de-licensed activity

- AI installed capacity: 391 GW/ RE:103 GW/ THM: 274 GW/ HYD: 47 GW/ NUC: 7 GW
 - 188 GW (48% Private Sector) (20 GW merchant)/ State: 104 GW/ State: 98 GW
- India is Power Surplus Nation
 - Peak Demd: 203 GW, IC Gen: 391 GW
 - India Exports power to SARRC Nations
 - Power Gen in FY 21: 707 BU

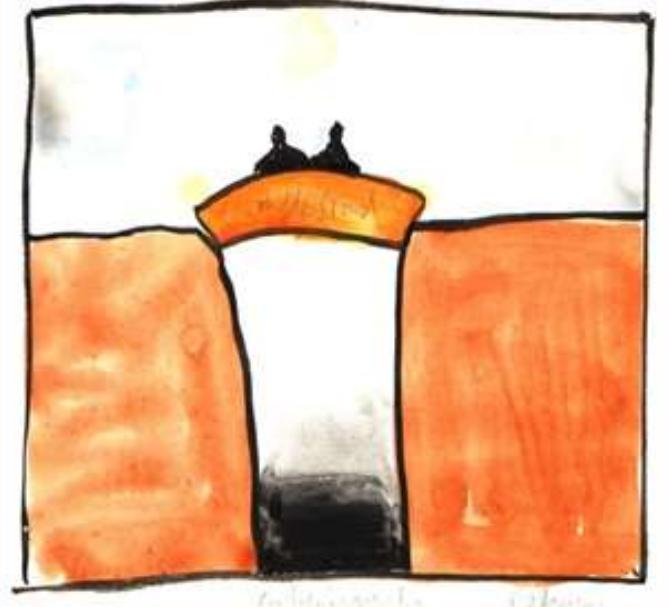
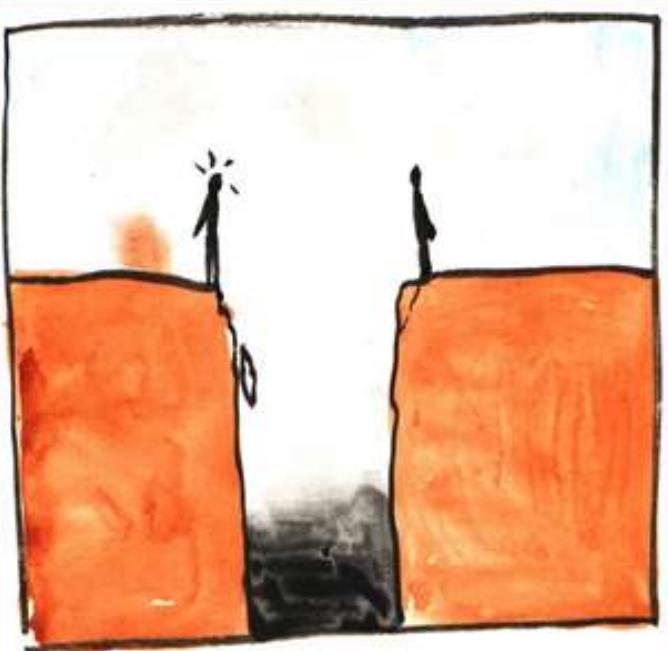
Trans: one of the World's largest network

- Inter-Regional Transmission Capacity: 102 GW
- Power Exchanges for “One Nation-One Grid- One Price”

Distribution:

- Weak infrastructure/ High Dist Losses/ financial crunch in Discoms (weak financial Status)
- Reforms underway.....





AI IC Growth:

- FY 10-11: 174 GW,
- FY 15-16: 299 GW,
- FY 20-21: 382 GW,
- FY 21-22: 391 GW

AI Gen (BU) :

- FY 10-11: 871 BU,
- FY 15-16: 1168 BU,
- FY 19-20: 1381 BU,
- FY 20-21: 1242 BU (effect of lock down)

- CAGR: Gen (GW) Capacity: 8% & Energy Gen (BU) increase of 5%
- This has led to surplus generation stage 10 years
- Globally, prices of Solar electricity & onshore wind have dropped 89% & 70% in the last decade.
- In India, solar power tariff dropped to an all time low of Rs. 1.99 PU in 2020

- Renewables now constitute **26% in present installed Gen capacity & it contribute 11% to overall AI power Gen.**
 - By 2030 India aspires to achieve 500 GW RE capacity constituting 50% of energy mix.
- **India's electricity Demd is expected to double in the next 6/7 years, driven by economic & aspirations.**

Major Transformations in Energy Sector: (Four Ds)

- **Decarbonization:** Deployment of low-carbon technologies: increasing Wind & Solar Gen share
- **Decentralization:** Small-scale Gen across T&D network (Distributed Energy Resources, Microgrids)
- **Digitization:** Intelligent Computer Systems & Apps to optimise plants & Grid: finally more consumer satisfaction
- **Democratisation:** Empowered consumers: Power Market development Economic power shift

Power Procurement by Indian Discoms

- Almost 85-90% of Energy sold by Discoms is procured thro' Long Term Power Procurement Agreements (LTPPAs: upto 25 years period) with Gencos & about 10-15% is procured thro' Short Term Power Transactions
- "Short-Term transactions of Electricity" refers to the contracts of less than one year period, thro':
 - Inter-State Trading Licensees directly by the DLs,
 - Power Exchanges (Indian Energy Exchange Ltd (IEX) & Power Exchange India Ltd (PXIL)
 - Deviation Settlement Mechanism (DSM): Unscheduled energy transfer, charges, based on frequency at that 15 Min block . Normal System Frequency Band is 49.90 to 50.05 Hz.

Let us revise fundamentals of Power Exchange (PEX)

- Power Exchange is a platform on which power is transacted (i.e bought & sold).
 - Buyers & sellers come together to transact.
- PEX's core function is to ensure fair & transparent transactions as well as efficient dissemination of price info to its stakeholders.
 - IEX/PXIL are approved Power Exchanges & are regulated by CERC. Their activities are regulated under various Regulations & procedures notified by CERC (Power Market Regulations 2010, as amended from time to time)

Technical requirements (for Members) to start trading are:

- Standing Clearance from SLDC of State/UT
- Presence of working ABT (Availability based Tariff) Meters at both sending & receiving ends
- Interstate Gen stations, Dist licensees, Electricity Traders, & State-embedded entities like IPPs, CPPs, OA consumers are eligible to become Members of PEXs

Power Exchanges (PEXs) in India



Two Power Exchanges in India, where electricity is traded:

- Indian Energy Exchange (IEX)
- Power Exchange of India Ltd (PXIL)

Power Exchange (PEX) enables participants to purchase electricity to manage their electricity portfolio for different duration:

- for the same day thro' intra-day contracts,
- for the next day thro' day-ahead contingency,
- on daily basis for rolling 7 days thro' daily contracts, & on weekly basis through weekly contracts
- Stringent Payment Security Mechanism (PSM)



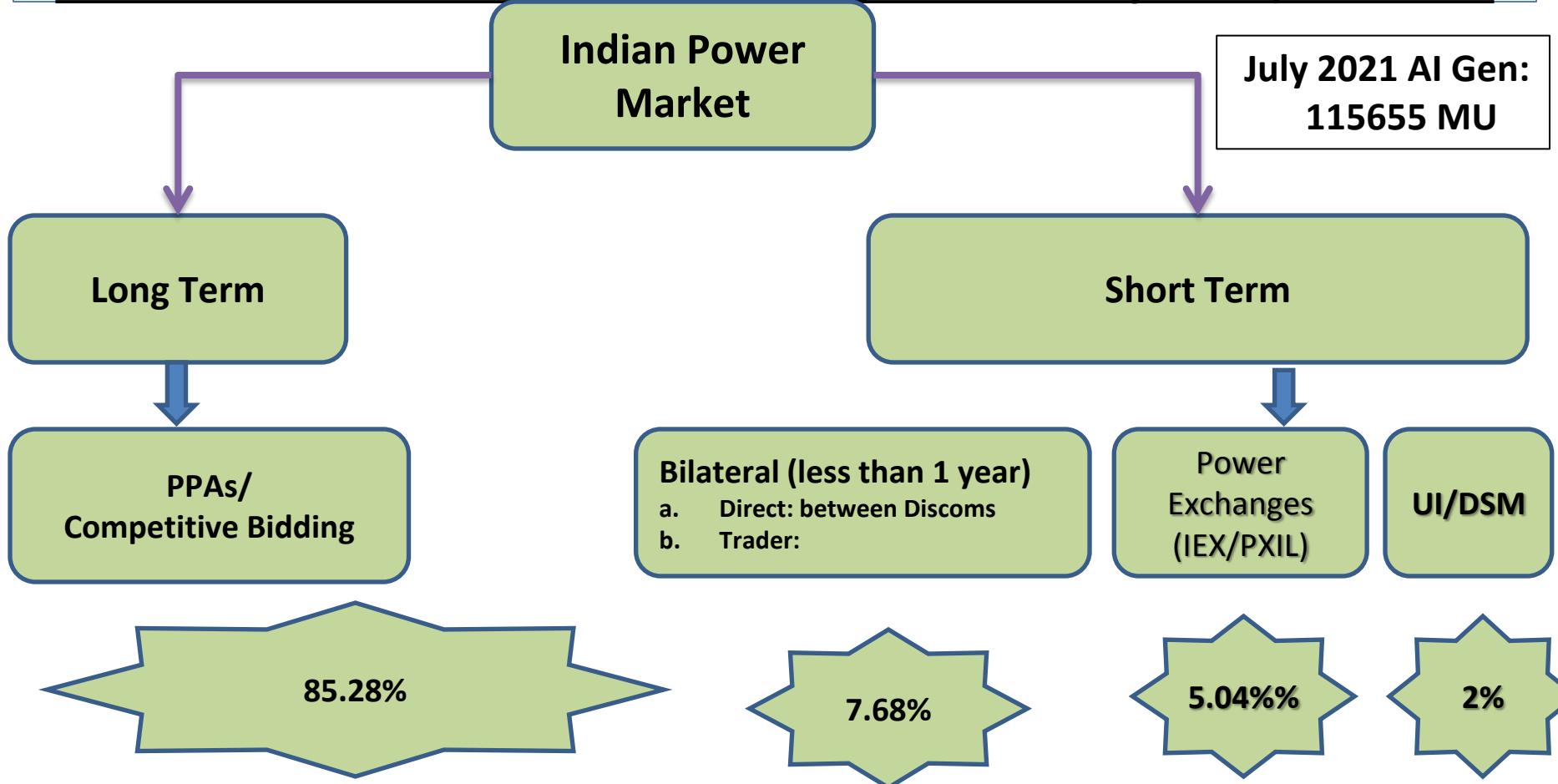
Six IEX Market Segments (in brief)

<u>Market Segment</u>	<u>Description</u>
<u>Day Ahead Market (DAM): since June 2008</u>	<ul style="list-style-type: none">• Delivery for Next day: 96 slots• Price discovery closed: Double sided Auction
<u>Term Ahead Market: since Sept 2009</u>	<ul style="list-style-type: none">• For delivery upto 11 days• Intra-day, Day Ahead Contingency, Daily Contract, Weekly Contract Auction
<u>Real Time Market (RTM): since 1 June 2020</u>	<ul style="list-style-type: none">• Delivery within an Hour• Price discovery closed: Double sided Auction (contentious Process)

<u>Market Segment</u>	<u>Description</u>
<u>Green Term Ahead Market (DAM): since 21 August 2020</u>	<ul style="list-style-type: none"> • Intra-day, Day Ahead, Daily & Weekly Contract (Auction)
<u>Renewable Energy Certificates (REC) Market: since Feb 2011</u>	<ul style="list-style-type: none"> • Green attributes as Certificates: Sellers: RE Gens not under Feed-In-Tariff (FIT). Buyers: Obligated Entities • 1 MWH = 1 REC (Auction)
<u>Energy Savings Certificates (E-certs): since 27 Sept 2017</u>	<ul style="list-style-type: none"> • 1 E-cert = 1 Mtoe (Metric Tonne Oil Equivalent) • Trading Sessions <u>on Every Tuesday</u> during 1300-1500 Hours (Auction)

Indian Power Market (Ref: Monthly Report on

Short-term Transactions of Electricity in India July 2021) CERC web site))



In July 2021 Electricity traded in day at IEX & PXIL was 5837 MU. Average market clearing price range at IEX was from Rs. 1.20 to 11.55 per Unit (Avg: Rs.4.26 PU) & at PXIL was Rs.1.90 to 8.80 per Unit (Avg: Rs. 3.94 PU) Bilateral: Rs 4.00 PU & DSM: Rs;2.34 PU)

Highlights of Power Procurement in July 2021:

- During July 2021, total AI Gen was 1,15,655 MU
- Of that, 14.72% was transacted thro' Short-term, comprising of 7.67% thro' bilateral (thro' traders & term-ahead contracts on PEXs & directly between Discoms), followed by 5.05% through Day Ahead Market (DAM) & Real Time Market (RTM) of PEXs & 2.00% through DSM

Of the total short-term transactions (17,030 MU),

- Bilateral constitutes 52.12%
 - 39.04% thro' traders & term-ahead contracts on PEX
 - 13.08% directly between Discoms
- DAM & RTM of PEX: 34.27%
- Deviation Settlement Mechanism (DSM): 13.61%
- Of the total volume of electricity transacted through power exchanges, 55.60% of the volume was transacted in DAM, followed by 23.47% in Term Ahead Market (TAM) (including G-TAM) & 20.93% in RTM.

- As on 31st July 2021, there were 36 trading licensees. Of which, 26 trading licensees were engaged in short-term trading.

Top 5 trading licensees, having a share of 84.18% in the total volume of electricity traded by all the licensees

- PTC India Ltd.,
 - Tata Power Trading Co. (P) Ltd.,
 - Manikaran Power Ltd.,
 - NTPC Vidyut Vyapar Nigam Ltd (NVVN) &
 - Adani Enterprises Ltd.
- Volume of electricity transacted in DAM of IEX & PXIL was 4238.25MU & 2.76MU respectively.
 - Volume of total buy bids & sell bids was 5212.61MU & 9281.58MU respectively in IEX, while the same was 32.38MU and 161.42MU respectively in PXIL (indicating ample almost twice power availability for sale on PEX)

Markets constitute higher share in developed economies.

- In Germany: 49%, UK:47%, Netherlands: 39% Switzerland: 34%, Belgium: 23%, France: 15% , power is transacted thro' PEXs, whereas it is only 6% in India, which is due to stringent PSM in PEXs. Otherwise for Long term contracts such stringent payment conditions are not there. Due to weak financial Status of Discoms, they are not in position a position to keep up stringent PSM (LC/BG/ Payment within 72 hours)

IEX transactions are increasing Y-O-Y (CAGR: 32% Rise since inception in 2008)

- 2008-09 2616 MU,
- FY 2014-15: 28,894,
- FY 2019-20: 59,908 MU,
- FY 2020-21-74,638 MU

Daily Avg Value of Traded Volume on IEX in Q2 (july-Sept 21) of FY 21-22:

- DAM+ TAM: 206.4 MU
- RTM: 59.58 MU
- GTAM + GDAM: 17.87 MU
- As on Sept 2021, 55+ Discoms, 500 + Gencos, 4400 IND Consumers all across India are taking part in IEX Market Transactions.
- In FY 21, IEX had a market share of over 92% in DAM + TAM and 99.9% in RTM, GDAM+GTAM , 76% in REC
- Green Market & Real-time Markets are poised to build India as a sustainable energy economy.

Growth Prospects for Power Market in India :

- Per capita electricity consumption (which is presently 1181 U/year: FY 20-21) is expected to double in next 5-6 years.
 - ~17GW THM capacity likely to retire by FY 22 & another ~26 GW likely to retire by FY 27.
- No new Long Term PPAAs (LTPPAs) have been signed in last 5/6 years in THM Power.
 - ~20GW of untied merchant capacity in India will increase the supply side liquidity on exchange
- Need: Launch of Longer Duration Contracts in Electricity & Green markets, Ancillary Markets, along with tech-based products & innovations

Five predictions for Energy Transition trends in the UK in 2022 (10/01)

Main Triggers for Energy Transition in 2022 will be:

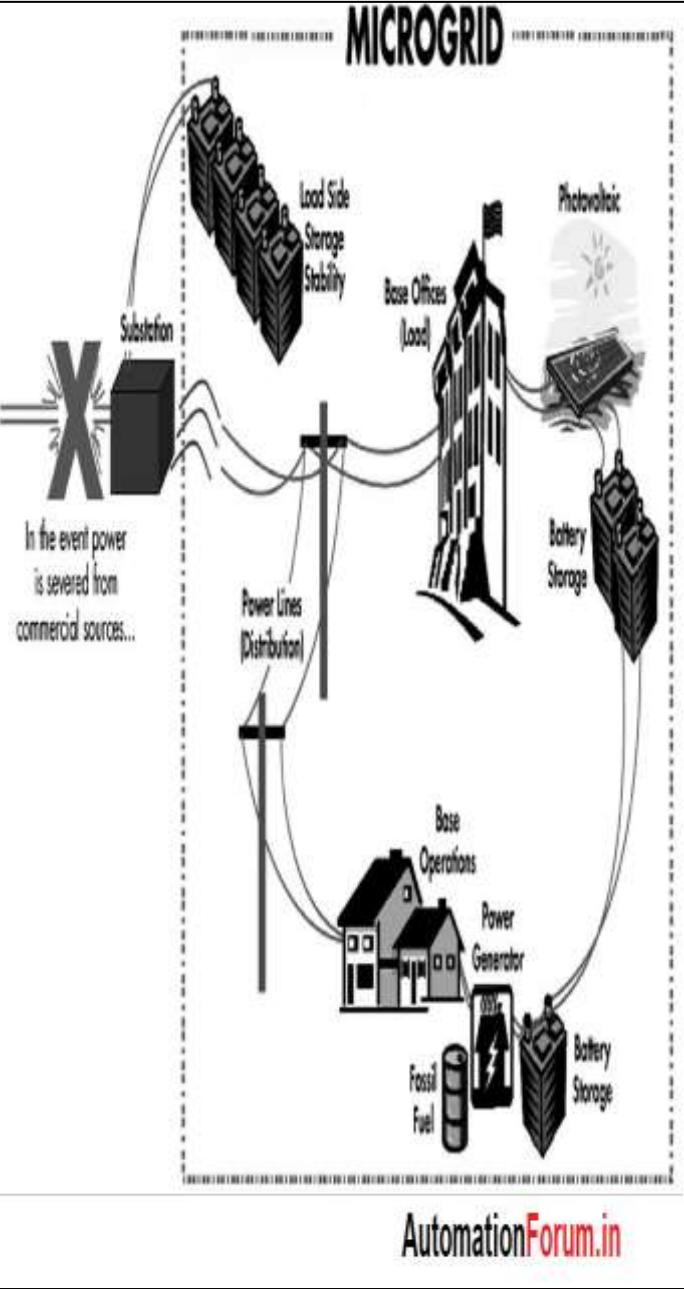
- Global shift towards more climate-conscious energy efficiency which accelerated need for sustainable technology to deliver a cleaner, greener energy systems
 - Businesses & consumers have a growing appetite for sustainable initiatives.
- Technologies for RE Gen, Energy Storage & Smarter Grids are essential to decarbonise existing supply & meet growing Demd from rapid electrification of new buildings, transport,& industry.
 - Considering this, Mr David Hall, VP Power Systems at Schneider Electric UK, predicts the top five trends in 2022,



Prediction 1: EVs to accelerate drive to low-carbon future :

- UK Govt has set a clear direction for IND by banning the sale of new petrol/diesel cars after 2030 & trucks after 2040 to reduce carbon emissions & stimulate the “Green Economic Recovery”.
 - As the adoption of EVs accelerates, there could be, additional pressure on ageing electricity networks. So Augumentation is necessary
- Work is underway to put in place a more resilient foundation to connect & power more significant numbers of EV charging stations & ensure a positive impact across the broader energy network





Prediction2: Microgrids (MGs) fit for future:

- It is important to ensure that the grid is ready for a digital future. More & more of energy supply will come from MGs & intermittent RES, creating a need for a more decentralised energy supply network.
 - According to recent research, 25.4% of UK & Ireland businesses claim to have installed a MG or RES (Solar, Wind) to reduce their ENV impact.
- While offering a reliable alternative to traditional Central Power grid, the grid itself needs to cope with more complex & bi-directional flows involved, with these new technologies & monitor supply & Demd more effectively.

Prediction 3: SF6-free: Silver bullet to sustainability

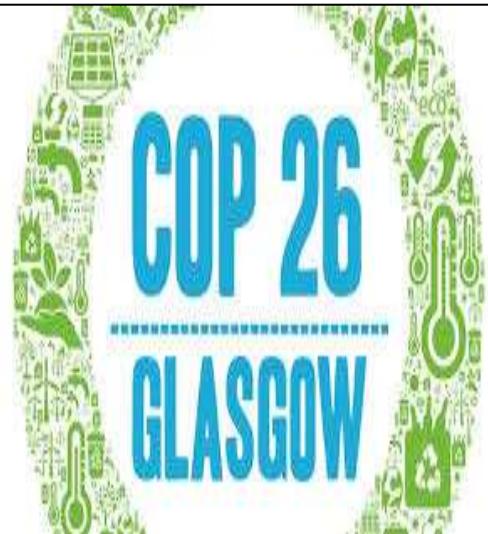
- SF6 (Sulphur Hexafluoride), while rare in the atmosphere, is one of the most potent Green House Gases in the world.
One tonne of SF6 has the same global warming potential as 23,500 tonnes of CO₂.
 - Most SF6 used in electrical IND is for electrical insulation & current interruption within power networks.
 - Replacing SF6 with pure air solutions is essential to reducing ENV risk across power networks. SF6 currently has a special exemption for use in electrical Dist across many geographies.
- However, as alternatives become more readily available, the EU (European Union) countries are considering measures to restrict its use, which is expected in next year

Prediction 4: Embrace the growing opportunity in On-shore wind:

- In On-shore wind power, turbines are located on land & use wind to generate electricity. They are generally located in areas where there is low conservation or habitat value.
- Growth in clean energy projects such as On-shore wind power is essential. It's becoming more apparent that wind energy is more efficient, as it produces no GHG emissions
 - By 2040, World of Electricity will be profoundly different: the share of electricity in everything we do will double, reaching at least 40% of final energy consumption, & 6 times more electricity will be generated from Solar & Wind.
 - Even with its benefits, connecting wind to the power grid brings with it a unique set of challenges: surges, dips, distortions, & stringent grid code requirements.
- Hence, in 2022, wind developers should also look towards combining wind Gen with “Energy Storage” to be more flexible.

Prediction 5: Net-zero commitments at the heart:

- With focus on sustainability & COP26 taking the World by a storm last year, it is clear, **businesses need to ensure this is a priority in their plans.**
 - According to Schneider Electric Research, more than 91.5% UK & Ireland respondents said reducing their carbon footprint is a priority for their organization, with a quarter of businesses (27.4%) saying it is their top priority this year.
- UK will be focusing more on ensuring these climate ambitions turn to action.
 - Businesses need to act now to handle energy management better to reduce energy waste & create a greener future by building smarter cities. That is the only way the UK will reach net-zero targets.



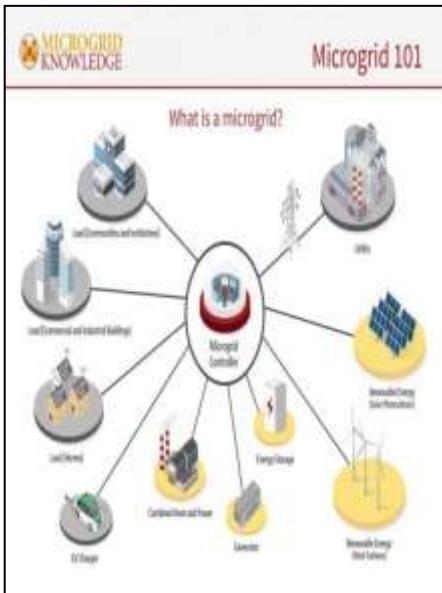
Hospitals Need: More Than a Backup: MGs May Be the Answer

(White Paper by MESA Solutions)



Hospitals: In top five energy-consumers, creating Increased Exposure to Risk:

- **Hospitals consume massive amounts of energy as they are always open 24x7, with constant use by thousands of employees, patients, & visitors.**
 - These Hospital buildings: rely on sophisticated heating, ventilation, & Air-Conditioning (HVAC) systems to control temps & air flow.
- All day, every day, energy-intensive activities like Laundry, Medical & Lab equipment use, Sterilization, Computer & server, Food Service, & Refrigeration are critical to the health & well-being of countless people in Hospitals
- Almost all large hospitals have emergency backup Power facility (Diesel Generators).
 - Backup power is only meant to run for a short period of time & may not be able to carry 100% of Hospital's large power load.



- **Hospitals need a more reliable, resilient, & robust power system: they need Microgrids (MG) .**
 - Hospitals have too much at stake to solely rely on a backup.
 - A MG can carry a hospital's full load **thro' outages lasting for weeks or even months.**
- **For many hospitals, the ability to control consumption & sell excess energy also presents financial advantages.**

Energy Delivery Is Too Unreliable for Critical Care Facilities even in the US :

- In 2016, users **experienced AVG of 1.3 interruptions & went without power for a cumulative total of 4 hours**
 - In 2017, U.S. customers saw nearly **8 hours of disruption**; in 2018, with fewer natural disasters, disruption was nearly **6 hours**.
- A quick glance at EIA's "**Major Disturbances & Unusual Occurrences**" data shows why:
 - In Feb 2021, One outage in Texas affected 2 Million users & lasted 312 hours & an outage in Illinois lasted 264 hours
 - Also in Feb 21, an outage in Oregon affected 300,187 customers & lasted 188 hours
- In Jan/Feb 2021, there were **14 outages lasting more than 100 hours in the US**

- One might expect that hospitals would be prioritized to receive power during Natural Disasters, but that's not always the case.
 - As a recent incident in Texas showed, it is oftentimes up to the power company to define, who gets the limited supply of electricity.
 - And in the case of Rolling Blackouts like those imposed in California, there is little that most customers can do but brace for the worse.

MGs are the Resilient, Efficient Solution for Hospitals:

- Hospitals have too much at stake to solely rely on a backup Gen, & in most cases MG technology is the solution, which can carry them thro' outages lasting for weeks or even months.
 - A complete MG solution intelligently coordinates a variety of onsite & offsite power sources to optimize costs & stability, including the option to be fully off-grid & self-supported during outages or disturbances.
- A MG is typically also coupled with Energy Storage & advanced controls that intelligently manage supply & demand.

- As a result, in an emergency a MG can continue to supply the Hospital with power, when the surrounding grid goes down. Unlike backup systems, a MG delivers value at all times, not just during power outages.
 - A MG operates 24/7/365 & becomes a part of Hospital's day-to-day power capacity.
- Additionally, most MGs in North America are connected to Central Utility Grid, which means the hospital retains the option to receive electricity from the utility.
- Hospital can also sell excess capacity to the local utility or in wholesale market. As a result, a MG has the potential to help a hospital achieve its cost & sustainability goals.
- Thus, MG meet hospital requirements for resiliency, carbon footprint reduction, & cost savings.

Potential for a hospital to use its MG technology as both a source of backup power & a source of revenue makes this technology more attractive than ever. Most hospitals are looking for a better, more cost-effective way to achieve 24/7/365 operations.

Chinese port congestion resulting in increased Solar Project costs in India (21/12)



- India meets over 90% requirement of solar modules from China.
 - Over 60-70% raw material is imported from China by domestic manufacturers, who assemble Solar modules here.
 - Local Solar module & cell manufacturers are not in a position to fulfil demand, hence India's reliance on Chinese imports has not come down.
- Gap in supply due to congestion of ships in Chinese ports (non-movement of consignments) has impacted the already increasing rate of inflation on solar modules, which leads to rising working capital requirement for solar projects
 - Chinese port congestion has caused “ripple effects” in the global supply chain. It has negatively impacted solar component shipments, (modules & solar cells).

Reasons for on-going Congestion:

- **COVID-19 induced closures & curbs** have resulted in a lack of adequate workforce & machinery at ports of Shanghai & Ningbo.
 - There are stringent quarantine measures in place for the crew on-board, when they enter China, which adds to the lead time.
 - There was a vast industry backlog created due to the Power shortage crisis in China, which resulted in lots of shipments getting bunched up together

Supply chain disruption directly impacts the project costs.

This has created a ripple effect in the ecosystem of exports, thus leading to higher freight pricing & overall imbalance.

- Uncertainty in the system has led to insecurity of supply chain, delayed timelines & increased costs. “Port Congestion” makes it an additional worry for Indian Solar Project developers.
 - Shipping costs have already been elevated since Sept 21

Current situation (as on 15th Jan 2022):

- Ports are functioning better than before, but there was an increased workload due to the Christmas holidays season for North America & Europe markets, increasing Demd on containers & shipping lines until end of Dec 2021/Jan 2022.
 - Moreover, the upcoming Chinese New Year holidays starting from Feb 2022 & Winter Olympics in Feb 2022 will lead to an increased workload for Jan/Feb 2022.
 - Apart from this, Indian Solar developers are worried about the impending Basic Customs Duty (BCD) (40%) implementation on imported modules will be implemented from 1 April 2022

(Kindly note: India meets over 90% of its solar module requirements from China. & the Authorities are proud of the fact that Chinese Apps on common man's Mobile have been banned)

GOI introduces penalty regime for non-compliance of Fly Ash utilisation (05/01)

- Fly ash is a by-product of coal-fired power stns. Domestic coal has higher “ASH” content.
- Ash is a fine Grey powder-like residue. It causes **ENV pollution, creates health hazards, & also requires a large area of land for disposal.**
 - Unused fly ash is dumped into poorly maintained ash ponds. Dumping of fly ash discharged from THM plants on the land or into the water bodies **leads to contamination of land & groundwater levels.**
- Now GOI has mandated THM plants to make 100% use of ash in an eco-friendly manner in 3-5 years.
- Non-compliance will invite penalty of Rs 1000/MT on the unutilized Ash at the end of each FY, based on the ‘polluter pays’ principle.
 - THM Plants have been mandated 10 years for making use of accumulated unutilized ash.



Utilization of Fly ASH:

Because of good Physical & Chemical properties of fly ash, it can be utilized in numerous ways:

- For construction of Roads (ready-micx concrete) / Bricks/ Tiles / Flyover embankments,
- in cement IND,
- Making fiber cement sheets, pipes, boards, panels.
- Backfilling of open cast mines & stowing of UG mines which results in saving of top fertile soil & river sand.
- As manure in AG sector as ash has many micronutrients
- For construction of shoreline protection structures in coastal districts.
- Power plants can also export ash to other countries.



FULLY AUTOMATIC FLY ASH
BRICKS MAKING MACHINE



Use For Bricks Boundary Wall
Commercial & Private Walls

Use of fly ash has considerably increased from nearly 10% in 1996-97 to 92% in 2020-21. Over 17 MT (8%) remained unutilized during last FY when 179 THM plants generated around 222 MT of fly ash.

INDIA RESIDENTIAL ROOFTOP SOLAR (RTS) MARKET

- India's Residential Rooftop Solar market has failed to grow in line with utility scale solar and C&I rooftop solar markets. Despite ambitious Govt targets & steady reduction in capital cost, annual installations of Residential RTS have been almost stagnant in the 100-200 MW range until FY2020. Only in FY 21 about 400 MW RTS (29% of target) were installed

GOI Schemes for RTS:

- Phase 1 Launch: Dec 2015 Target: 4.2 GW Subsidy: 30%
- Phase 2: Launch: Feb 2020: Target: 4 GW: Subsidy: 20 - 40%

Only about 0.4% of independent urban homes, equivalent to 4 Lakh are estimated to have installed RT solar systems so far. Total residential RTS capacity as of June 2021 is estimated at 6111 MW. (15% of Target)

- Estimated target addressable market for residential RTS systems at about 520 Lakh H/H by 2030 (10% of urban independent households)

- Net metering in most States also strengthened investment case for residential RTS. AVG marginal tariff for a H/H with monthly consumption of 300 kWh in 15 states, accounting for 90% of residential consumption, is Rs 7.18 PU (FY 21) : Installing an RTS is effectively yielding an investment IRR of 8.3% for 3 kW system.

Biggest hurdle to growth is consumer inhibition & low awareness about Technical, Financial & Operational aspects of installations.

- RTS is not deemed as essential purchase because of improved reliability of grid power.

Reasons for slow speed of installation of RTS systems:

- No fixed rights to roof (living in residential complexes)
- Keen to retain free rooftop space
- Living as tenants
- Roofs unsuitable for rooftop systems
- Unwilling to make long term commitment

- Net capital cost, after 40% upfront subsidy from MNRE for systems under 3 kW, is currently estimated at 32,000/kWp (assuming module cost of Rs 18.7/ Wp).
 - Cost increases arising from increase in module cost, import duties (Basic custom duty of 25% on cells, 40% on modules) & GST (increased from 5% to 12%) are also a potential dampener in the short-term
 - Market Demd is skewed towards 'value conscious' consumers residing in independent homes in tier 2-3 cities. Consumer conversion cycle is usually very long, typically up to six months, with low success rates.

Policy framework:

- Mainstay of Govt policy for residential RTS is 20-40% capital subsidy with a total budget of Rs 66 Bn, which is a major market enabler despite multiple implementation challenges. As of June 2021, MNRE had sanctioned subsidy support for 3 GW capacity in 31 States & UTs but disbursements are still very slow.

Thus, Residential RTS market has very attractive growth potential. It is expected that the market to pick up pace, with gradual improvement in affordability, financial viability & consumer awareness as well as policy implementation

Reasons for Shadow on Rooftop Solar (RTS) Progress

Slow progress can be attributed to POOR policy framework

- *Each Discom is responsible for solar RT installations in its own area.* Discom calls the open bids for RTS installations. These Bids (tenders) have almost negligible qualification criteria, specified by Discoms
 - Lack of qualification criteria results in very aggressive bidding from players, who don't understand the costs involved, & this ends up vitiating the market thoroughly. Most experienced installers stay away given the unviable tender prices.
- Some Tenders stipulate that Residential RT solar plants should be cleaned & maintained by Solar installer for 5 years after commissioning, & further insists that insurance should also be obtained by installer for 5 years.
 - In fact, Consumers own RTS, once installer installs it “Like consumers buy insurance of a vehicle & not its manufacturer. Why should installer pay for insurance, when they agree to provide customer service & Guarantee for 5 years?

Overarching role given to Discom in the framework:

- Installer is expected to maintain stringent plant performance ratios (75% throughout first five years), that are not possible to achieve in residential projects given **“urban dust levels”**.
 - To tie all this in, the bidder is expected to give a stiff Bank Guarantee (BG) for five years, which gets encashed if any of these 75% performance ratio conditions are not fulfilled
 - A variety of factors can cause a lower than 75% performance ratio: Dust, shadow on solar panel due to new building nearby or growth in the height of a tree overlooking the RTS panel, & unstable grid supply can cause fluctuation in performance ratio.
- Discoms have lesser interest in promoting, RT Solar, since they loose revenue from paying Hi Revenue Residential consumers
 - Discom's insistence on micro-managing every installation may sound commendable, but it should not come at the cost of transferring even the minutest burden on to the installer.
- There is a substantial delay in providing Net-meters by Discoms Ideally, Net meters should be available off-the-shelf in the market, & Discom's role should only be to inspect plant & seal the meter.

Irrational conditions placed by implementing agencies (some Discoms) are:

- **Remote Monitoring System (RMS)** needs to be provided along with RTS. RMS should contain a bidirectional grid interface meter **to monitor import energy, export energy, net energy, Solar Gen energy, voltage, current, billing parameters, percentage of device connectivity, % of data availability.**
 - Discom Officials from their office should be able **to check the performance of any RTS installed anywhere thro' RMS.**
 - In fact, RMS with these features is not developed in India or abroad. It is not available anywhere.
 - **Bidders wanted Discom to remove this conditions or give sufficient time during which bidders can develop such RMS.**
 - **As per MNRE guidelines, Discom has to provide the RMS & not empanelled agency or consumer.** Because Discom wants to monitor it & consumers don't have any use for it

Proactive decision by MOP/MNRE Households free to install Rooftop Solar (RTS) by any vendor under Govt scheme: MNRE (22/01)

- MNRE on 22/01 said households are free to get RTS panel installed by themselves or by any vendor of their choice & a photograph of installed system for Discom is sufficient to avail benefits or subsidy under GOI scheme.
 - Earlier under RT solar scheme, H/H were required to get RTS installed from the listed vendors only, to avail the benefits & subsidy under the scheme. Decision to simplify RT solar scheme was taken in a review meeting chaired by Union Minister for Power on Jan 19, 2022.
- Hon Minister gave directions for simplifying the RTS Scheme, so that people are able to access it easily. So, henceforth, it will not be necessary for any H/H to get RT solar panel installed only by the listed vendors.
 - H/H may also install RT solar panel by themselves or get RT solar panel installed by any vendor of their choice, & inform Discom about the installation along with a photograph of the system, which has been installed, for availing benefit of CFA (upto 40% subsidy)

- Further Discom will ensure that the net metering will be provided within 15 days of the information being received.
 - Subsidy to be given by Govt, which is 40% for RT of up to 3 KW capacity & 20% beyond that up to 10 KW will be credited to the account of H/H by Discom within 30 days of the installation.
- In order to ensure that the quality of the solar panel & the inverter is according to the prescribed standard, GOI will publish from time to time the lists of solar panel manufacturers & inverter manufacturers whose products meet expected quality standards & price lists thereof & H/H can select the Solar panels & Inverter of his choice.
 - Option of getting RT solar panel installed by any of the vendors designated by the Discom remains available as earlier. In such cases also, H/H may select the solar panel & inverter of his choice



Thanks! Your kind response is awaited!!

(Contact: vsonavane@gmail.com M:9833362062)

**If they respect you,
respect them.**

**If they disrespect you,
still respect them.**

**Do not allow the actions
of others to decrease your
good manners, because you
represent yourself,
not others.**

